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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,682	03/26/2004	Masaru Takaishi	AI 332	7861

7590 12/06/2005

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EXAMINER

SARKAR, ASOK K

ART UNIT	PAPER NUMBER
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2891

DATE MAILED: 12/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EK

Office Action Summary	Application No. 10/809,682	Applicant(s) TAKAISHI, MASARU	
	Examiner Asok K. Sarkar	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/26/2004</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group II claims 6 – 13 in the reply filed on November 17, 2005 is acknowledged.
2. Claims 1 – 5 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group I claims, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on November 17, 2005.

Claim Objections

3. Claim 7 is objected to because of the following informalities: The meaning of the size of the cell is not clear. For examination purposes it was taken to be the width of the individual cell. Appropriate correction is required.

Claims 10 – 13 are objected to because of the following informalities: The phrase "source deriving" should be changed to "source driving". Appropriate correction is required.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 6 – 8, 10, 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kinzer, US 6,144,067.

Regarding claim 6, Kinzer teaches a semiconductor device comprising:

- plurality of cells each including drain region 106 of a first conductivity type, a channel region 104 of a second conductivity type different from first conductivity

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type and a source region 109 of the first conductivity type stacked this order on semiconductor substrate so as to be capable of forming a channel in a direction of a thickness of the semiconductor substrate; and

- a low resistance region 202 of the second conductivity type having a conductivity higher than that of the channel region, the low resistance region forming a part of an inner wall of a hole 200 formed between adjacent ones of the plurality of cells, the low resistance region extending an isotropic manner with respect to a predetermined region in the hole so as to be in contact with the channel region, wherein the drain region is shared by the plurality of the cells with reference to Fig. 8.

Regarding claim 7, Kinzer teaches the size of the cell to be smaller than 2 μm with reference to Fig. 2

Regarding claim 8, Kinzer teaches a device wherein the low resistance region 202 and the source region 109 are in contact with each other with reference to Fig. 8.

Regarding claims 10 and 13, Kinzer teaches a semiconductor device comprising a source driving electrode 102 being in contact with the source region and shared by the plurality of cells, wherein the low resistance region and the source driving electrode are in contact with each other with reference to Fig. 8.

Regarding claim 11, Kinzer teaches a semiconductor device comprising a source driving electrode being in contact with the source region and shared by the plurality of cells, wherein the low resistance region and the source region are in contact with each other.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinzer, US 6,144,067 in view of Darwish, US 6,008,520.

Kinzer teaches a source driving electrode being in contact with source region and shared by the plurality of cells, but fails to teach the low resistance region and the drain region are in contact with each other.

Darwish teaches a low resistance region 402 that is in contact with the drain region with reference to Fig. 12C for the benefit of reducing the resistance of the MOSFET when it is turned on in the abstract of the disclosure.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Kinzer and increase the depth of the P⁺ region to be in

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contact with the drain region for the benefit of reducing the resistance of the MOSFET when it is turned on as taught by Darwish in the abstract of the disclosure.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Asok K. Sarkar
December 2, 2005

Primary Examiner